time was beautified and repaired, and from time to time battered and defaced. George, Earl of Warwick, did much to make the place more grand and noble than it had ever been. While the civil war lasted between Charles I. and his parliament, it was garrisoned by the latter, and was besieged by Lord Northampton. When the royalists gained possession of the place, it was besieged by its old masters, and defended against them for sixteen days by one small piece of ordnance and a few muskets. The castle was thoroughly repaired and beautified in the reign of Charles II.

Speaking of the old fortress, Sir William Dugdale says:—"Here is to be seen a large two-handled sword, with a helmet and a certain plate armour for horse service, which, as the tradition is, were part of the accoutrements sometime belonging to the famous Guy; but I rather think they are of much later date; yet I find that in the first of Henry VIII., the sword having that repute, the king granted the custody thereof to William Hoggeson, one of the yeomen of the buttery, or his sufficient deputy, with the fee of eleven-pence per diem for that service."

MOTHS.

THE butterflies, of some of the principal forms of which, and of their transformations, we gave a short account in a recent article, furnish a very excellent illustration of the order of insects to which they belong. These insects are called *Lepidoptera*, or scaly-winged insects, from one of their leading characteristics, the possession of four filmy wings, thickly covered with minute scales, to which the beautiful colouring of the butterfly's wing is due. This, however, is not the only common character by which these creatures are at once united amongst themselves and distinguished from other insects: the great completeness of the metamorphosis which they undergo, from a crawling caterpillar to a creature whose life is spent almost entirely on the wing, with an intervening state of perfect repose, is another distinction, which, although by no means peculiar to the *Lepidoptera*, yet serves to separate them from several other orders of insects, in which the difference between the form of the creature on emerging from the egg and that which it is destined to acquire is much less. A more important character than the scaly covering of the wings is presented by the peculiar structure of the mouth, which in these insects consists of a long tongue rolled up in a spiral form between a pair of hairy organs, called *palpi* or feelers. Different as these delicate organs appear, at first sight, from the powerful jaws by which the caterpillar gnaws his destructive path through the produce of the garden and the field, the same parts, modified indeed in form, may yet be recognised in the perfect insect that existed in its crawling, worm-like, preparatory state. The strong biting jaws have become very small, although in most cases they are to be found concealed under the other organs of the mouth. But the second pair of jaws, with which the caterpillar masticates his food, have undergone a wonderful transformation—it is from these that the long spiral trunk has been formed. These, in the perfect insect, as in the caterpillar, are jointed organs; but in the former the terminal portion of each is drawn out into a long filament, furnished on its inner surface with two narrow ridges, which fitting exactly to those of the other filament, form by their union a long slender tube, piercing the trunk through its entire length. The lower lip of the caterpillar also shares in the changes undergone by all the neighbouring organs. In the preparatory state it is furnished with a pair of minute feelers and with a fine tube, the orifice of the silk apparatus, by means of which the creature, when ready to pass into the chrysalis condition, attaches itself to some point of support, or encloses itself in a silken bag, in obedience to the instincts implanted in it by nature. This tube, being of course useless to the insect in its last condition, is then no longer to be found; but the little *palpi* or feelers acquire an enormous development, and form the hairy bed in which the trunk is nearly concealed when coiled up in repose. The antennæ, also, which in the caterpillar are very small, are converted in the perfect insect into long organs of very various forms; and the organs of vision, instead of consisting of a few little black points on each side of the head, are developed into those beautiful globular structures which may be seen to constitute the great bulk of the head in any of our common butterflies.

The most striking general difference between the two great groups of *Lepidoptera*, butterflies and moths, is to be found in the form of the antennæ, which in the former are always clubbed at the tip, whilst in the latter they are thread-shaped or tapering, or sometimes thickened towards the end, but afterwards tapering to a fine point. Another distinction, which is of still more importance in a scientific point of view, is that, in the moths, the wings of each side are united during flight by a small bristle attached to the anterior margin of the hind wing, which passes through a little loop formed on the hinder margin of the forewing; this arrangement is wanting in the butterflies.

In the sphinxes, which from their great power of flight are generally known by the name of *Hawk-moths*, the antennæ are always thickened beyond the middle, but taper afterwards to a fine point. Some of these have trunks of great length, by means of which they extract the nectar of flowers, whilst hovering over them in the manner of a humming-bird. From this habit, and its size and general bird-like appearance when on the wing, one of the commonest of our native sphinxes has received the name of the Humming-bird Hawk-moth (*Macroglossa stellatarum*). A nearly-allied and very beautiful species is represented in the accompanying woodcut (fig. 1). This is the Drone-bee Hawk-moth (*Macroglossa fuciformis*), an insect only occasionally found in this country, but which appears to be common on the continent. The general colour of the body is a bright olive green, yellowish at the hinder extremity, where there is also a black tuft of hair on each side; across the middle of the body there is a dark brown band; the wings are transparent with a dark brown border, and the anterior pair have an olive-green patch close to the body. In the Humming-bird Hawk-moth, the wings are covered with scales throughout, but in form and habits the two insects very closely agree.

In the Death's-head moth (*Acherontia atropos*, fig. 2), which also belongs to the group of Hawk-moths, the trunk, instead of being very long, as in the preceding insects, is reduced to comparatively small dimensions, being scarcely longer than the head of the moth, whilst in the Humming-bird Hawk-moth it exceeds the whole body in length. The Death's-head moth is the largest of European moths, measuring sometimes upwards of five inches in expanse of wing; its general colour is a blackish-brown; the fore-wings are irregularly clouded with dull orange, and have a white spot near their middle; the hinder wings are dull orange with two brown bands. The body is banded with orange and black, and the appearance of the insect is rendered exceedingly remarkable by the very singular marking of the thorax. This bears a large dull orange patch, within which are smaller blackish spots, producing on the whole a by no means indistinct representation of the popular "death's head." This peculiar mark, coupled with the generally funereal character of the coloration of the insect, has on some occasions obtained for it an unenviable position in the popular mind, as its appearance in larger numbers than usual has been regarded, in some places, as portentous of an approaching pestilence. Singularly enough, in the year 1733, it appeared in great numbers in Brittany, simultaneously with a very fatal epidemic disease; and so completely did the weaker and more ignorant of the country people consider the insect as the cause of the distemper, that the sight of one was sufficient to produce the greatest fear in

the beholder, who regarded it as the messenger of approaching death. The Death's-head moth possesses another curious faculty, which no doubt conspired with the symbols of death with which it is ornamented to raise a feeling of superstitious dread in the minds of those whose attention was called to it for the first time; when irritated or handled, it emits a little plaintive cry or squeak. This circumstance has long been known, but although several eminent naturalists have endeavoured to explain the mode in which the sound is produced, they do not yet appear to have arrived at any satisfactory conclusion on the subject. The faculty of emitting a sound is probably connected with a singular habit of this insect, which renders its multiplication in unusual numbers an object of real and well-founded dread to keepers of bees. The moth has a most gluttonous taste for honey, and is one of the most inveterate plunderers of bee-hives. The bees, on its entrance into their domicile, generally disperse immediately, as though in dread of the gigantic intruder, who is thus left to surfeit himself at his ease upon the sweet stores which these industrious creatures had laid up for their winter store. "It is singular," says Mr. Westwood in speaking of this circumstance, "that a creature, with only the advantage of size, should dare, without sting or shield, singly, to attack in their stronghold these well-armed and numerous people; and still more singular, that amongst so many thousands of bees, it should always contend victoriously." It has been supposed that the thick fur with which the moth is covered prevents the stings of the bees from reaching its body, but it seems far more probable that it employs its power of emitting a sound, and perhaps some other means, to spread terror amongst the ranks of its assailants. The caterpillar of this moth is, as might be expected, of great size, measuring sometimes as many as four inches and a half in length, and two-thirds of an inch in thickness. Like all the other caterpillars of the Hawk-moths, it has a longish horn attached to the back of the eleventh segment. It has also, in common with most of its near allies, the habit of raising the anterior segments of the body, supporting itself by adhering to the branch on which it rests by the membranous feet of the hinder segments. In this attitude these caterpillars present to a fanciful mind a slight resemblance to the sphinx of the Egyptians, and this induced Linnæus to apply the generic name of *Sphinx* to the whole of these moths. The caterpillar of the Death's-head moth lives principally upon the potato, and the chrysales are frequently turned up in digging up potatoes in autumn. The moth generally appears in October, but rarely flies by day.

Another very beautiful species of hawk-moth, very common in this country, is the Lime Hawk-moth (*Smerinthus Tiliæ*, fig. 3), so called from its caterpillar feeding principally upon the common lime-trees. This moth has the fore wings much notched at the tip; it varies greatly in colour, but in the

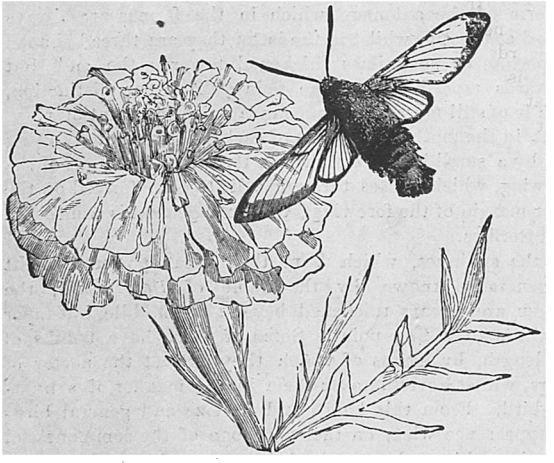

FIG. 1.—THE DRONE-BEE HAWK MOTH (MACROGLOSSA FUCIFORMIS).

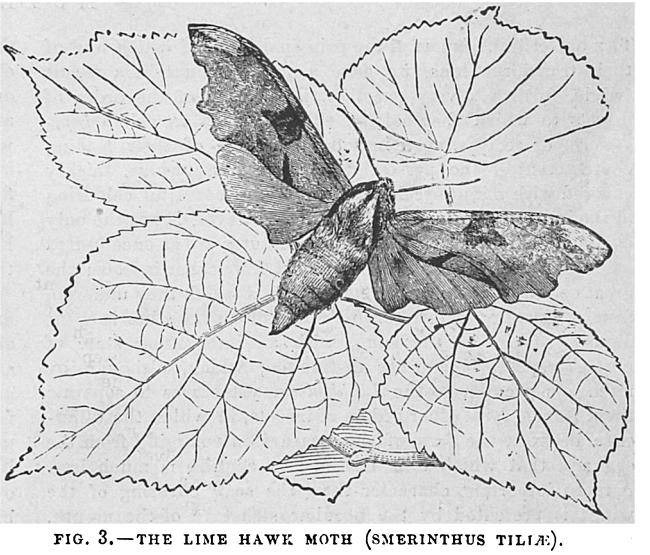

FIG. 3.—THE LIME HAWK MOTH (SMERINTHUS TILIÆ).

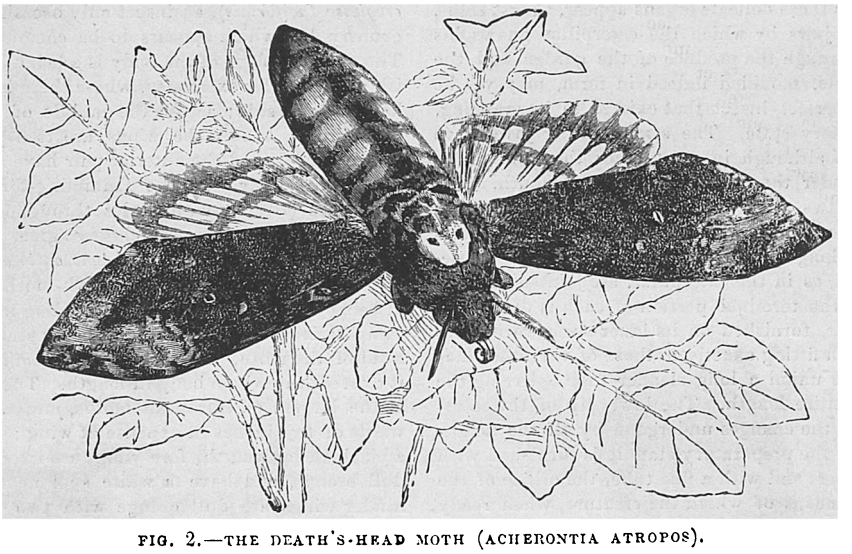

FIG. 2.—THE DEATH'S-HEAD MOTH (ACHERONTIA ATROPOS).

variety most generally met with the wings are of a fawn colour, with a broad band at the tip, and two spots, about the middle of the fore wings, olive-green. In this moth the trunk is even shorter than in the Death's-head moth.

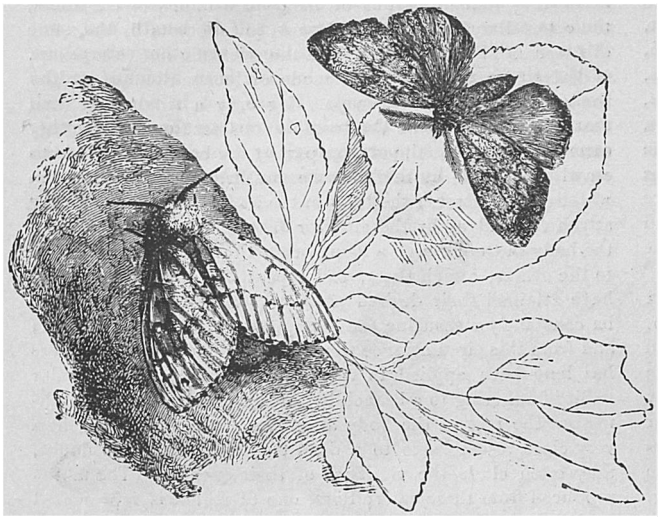

FIG. 4.—THE GIPSY MOTH (HYPOGYMNA DISPAR).

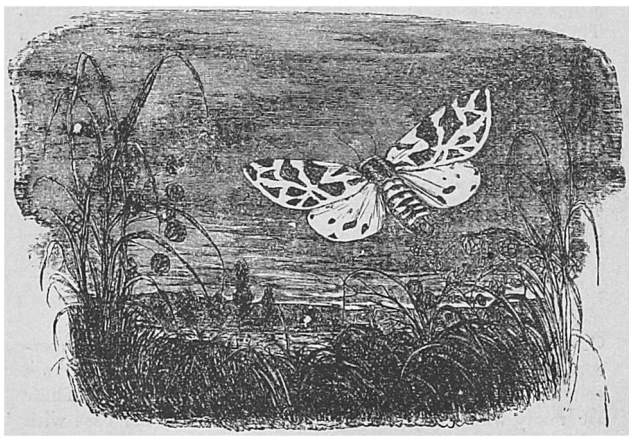

FIG. 5.—CHELONIA PUDICA.

FIG. 6.—THE LAPPET MOTH (GASTROPACHA QUERCIFOLIA).

The antennæ in the hawk-moths are generally more or less toothed like a comb on the inner surface; but this character is by no means so striking in them as in some other moths, in which the antennæ, at all events of the males, are toothed or pectinated on both sides; the little filaments forming the combs being frequently of such a length as to give the entire antennæ the appearance of a delicate feather. An instance of this is presented by the male of the insect here figured, the Gipsy moth (*Hypogymna dispar*, fig. 4), which occurs not uncommonly in some localities in England. In appearance

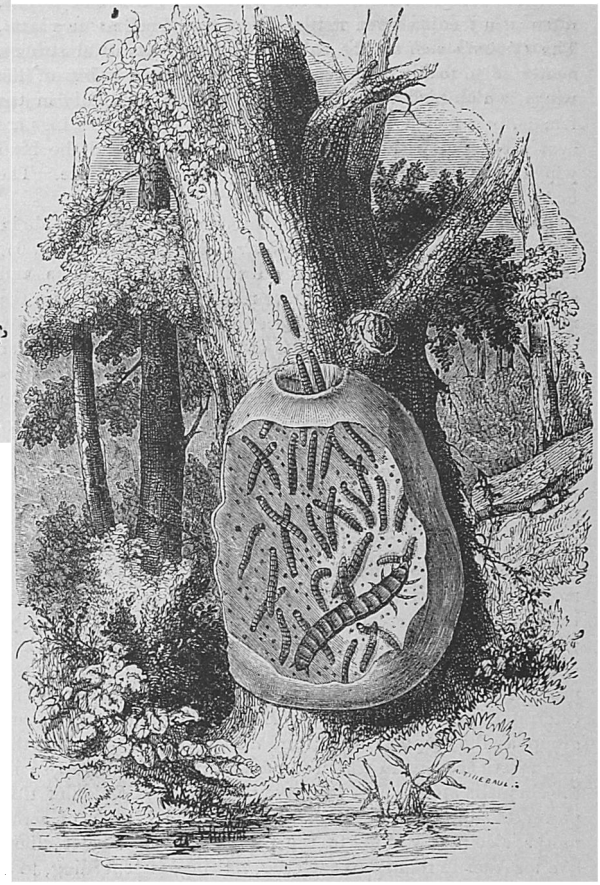

FIG. 7.—NEST OF PROCESSIONARY CATERPILLARS (CNETHOCAMPA PROCESSIONEA).

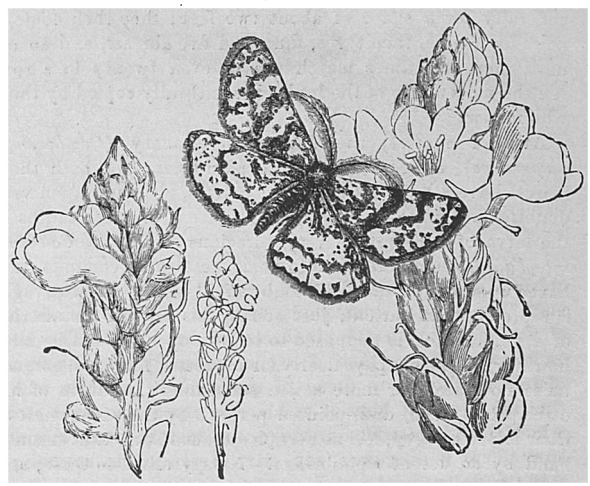

FIG. 8.—FIDONIA PLUMISTARIA.

the two sexes of this moth differ considerably from each other; the male is much smaller than the female, and is of a grayish colour, with some blackish lines and spots on the fore wings, whilst the female is white with dusky lines, describing much the same pattern as in the male. The caterpillar feeds on fruit-trees. A very common and beautiful British insect, nearly allied to this, is the great Tiger moth (*Arctia caja*), which is produced from the large hairy bear-like caterpillars, often seen feeding upon nettles and other hedge-side plants. The *Chelonia pudica*, (fig. 5) is another very beautiful species, nearly allied to the two preceding. The ground colour of the wings is a pinkish white, the hinder wings, especially in the female, being of a delicate pink colour. The fore wings are nearly covered with a number of black spots, and the hind wings have two or three similar spots of variable size. The body is spotted or banded with rose colour and black.

The feathered structure of the antennæ is also observable in the male of the Lappet moth (*Gastropacha quercifolia*, fig. 6), the caterpillar of which feeds on various trees. This and some allied species of moths have received from collectors the name of Lappet moths, on account of the curious fleshy appendages attached to the sides of the body of the caterpillar and which completely conceal the feet. These caterpillars are very hairy, and when handled the hairs penetrate the skin and produce considerable inflammation and itching. The moths are also called *Eggers*, from the chrysalis being enclosed in a very smooth, fine, egg-like cocoon. The Lappet moth (*Gastropacha quercifolia*), represented in the annexed cut, is rendered further remarkable by the curious position assumed by the hinder wings during repose; these, instead of being concealed by the upper wings, as is the case in other moths, project on each side in the form of rounded notched leaves, giving the creature a very singular appearance. The general colour of the insect is a deep reddish brown, marked with blackish lines. The silk-worm, with the manufactured produce of whose beautiful cocoon we are all familiar, is the caterpillar of a moth (*Bombyx Mori*) belonging to the same group as the Lappet moth; and many of our common moths also weave cocoons in which to pass their season of repose in the chrysalis state. But the most singular application of this power of silk-spinning is exhibited in the history of some moths, also nearly allied to the preceding, whose caterpillars live together in numerous societies, retiring, after feeding, to a capacious nest of tolerably firm texture, woven by themselves from the materials afforded by their own bodies. Some of these, as the Processionary caterpillar (*Cnethocampa processionea*, fig. 7), quit their nest, which is generally attached to oak-trees, in a regular and well-ordered procession; one caterpillar takes the lead, and is followed by others in single file generally for a space of about two feet; they then come in pairs for a time, then three, four, and five abreast, and so on, until they sometimes march ten or even twenty in a row. All the movements of the leader are faithfully copied by those who follow.

Another species, the Pine processionary (*Cnethocampa pityocampa*), attaches its nest to pine-trees, and both these insects have been said to occur in Britain, although upon very doubtful authority. The principal enemy of these moths is the larva of a large and very voracious beetle, the *Calosoma sycophanta*, which breaks into their nests and commits vast havoc upon the defenceless inhabitants; one of these savages is represented in our cut, just seizing his prey in the interior of a nest, which is supposed to be torn open. Occasionally, however, the tyrant pays dearly for his feast; for when gorged, he is no match for more active and hungry members of his own species, who, disappointed perhaps by the vacant nest of their expected prey, feel no scruples about taking it at second-hand by an act of cannibalism. Nearly allied to these, and especially to the silk-worm moth, is the gigantic Atlas moth (*Saturnia Atlas*), which inhabits the East Indies and China. This moth measures between eight and nine inches in expanse of wing; and other species nearly as large are found in several tropical countries. Many of these insects—some of which furnish a silk which is used in manufactures—have singular transparent spots in the centre of the wings, looking as though pieces had been cut out and replaced by fragments of talc.

Of the remaining groups of moths our space will not allow us to say much, and we shall only refer to one of the most interesting and numerous of them—the family of *Geometers*, the caterpillars of which are known to collectors by the name of *Loopers*. This name, as well as the scientific one (*Geometræ*), is derived from the singular mode of locomotion adopted by the caterpillars. These, possessing only a single pair (and that the hindmost) of the membranous feet on which other caterpillars support the greater part of the body, are unable to crawl like their more fortunate brethren; accordingly, in walking, they stretch the body out to its full length, when they attach themselves by the anterior feet, and then, drawing up the body in the form of a loop, bring the hinder feet close up to the others, attach them, and repeat the process until they have attained their desired position. Hence they appear to be constantly measuring the distance over which they travel; and from this circumstance the name of geometric caterpillars has long been applied to them. They have also a singular habit of adhering to a branch by their hinder feet, and stretching out the rest of the body in such a manner as to present a very close resemblance to a dead twig: and thus, no doubt, they often elude the vigilance of their enemies. The moths produced from these caterpillars, one of which is represented in the annexed engraving (fig. 8), are of a much slighter make than those already described; their bodies are slender, their wings soft and weak, and their flight irregular and fluttering. They are mostly truly nocturnal insects, very few of them being ever seen in the day-time. Space, unfortunately, forbids our entering upon the history of the vast numbers of smaller moths which form the concluding groups of the *Lepidoptera;* but their economy presents much to attract the attention even of the most careless observer; and the singular habits of the leaf-rolling and leaf-mining caterpillars will afford a never-failing source of interest to any one who will take the trouble to study them.

DOWN A WELSH COAL-PIT.

Once upon a time an exciseman at Merthyr Tydvil was overcome with liquor and fell fast asleep. Excisemen are not generally a popular class among the Britishers. There are many who owe them a grudge. This was the case with our hero. Accordingly, the enemy, in the shape of a dozen dusky colliers, made their appearance, and deposited their ignoble prize

"Full many a fathom deep,"

as Tom Campbell sang, in a coal-pit. From his glorious dreams, in which most undoubtedly he fancied that he

"Dwelt in marble halls,"

in time the exciseman woke. Wonderingly he opened his eyes and looked around him. Where was he? His troubled conscience suggested the answer. His fears had become true; he had been condemned for his sins to that fearful locality, which a fashionable clergyman told his hearers he would not name in so respectable and well-dressed an assembly. Everything around the stupified exciseman was dark and drear. There he was, far away from the light of the sun and the haunts of men. At length a light appeared in the distance—it came nearer—by its glare a form somewhat resembling the human was distinctly visible. As it came nearer, the exciseman felt with Hamlet—

"Be thou a spirit of health or goblin damn'd,
Bring'st with thee airs from heaven or blasts from hell,
Be thy intents wicked or charitable,
Thou com'st in such a questionable shape
That I will speak to thee."

Accordingly he did, and told a melancholy tale—how he had been an exciseman on earth, how he had been guilty of the vice of drinking, and how he felt he was little better than one of the wicked. The joke had now been carried far enough